THE ROADWAYS

EARLY ROADWAYS

Map of the state of Delaware from 1800.

THE ROADWAYS FROM EARLY SETTLEMENT TO EARLY URBANIZATION

Roadbuilding in the Settlement and Occupation Periods

(Delaware Comprehensive Plan Periods 1630-1730, 1730-1770)

Rivers and Early Trails

The primary mode of transportation in Delaware during the seventeenth century was by means of the waterways. The first European settlers in the state were the Dutch, who were quickly followed by the Swedes and the English. Early settlements included Fort Christina, built in 1638 by the Dutch and Swedes as the forerunner of Wilmington, and Fort Casimir, erected in 1651 at the site of modern New Castle. These settlements were located on bodies of water, which provided easy access to incoming supplies and colonists. The travel which occurred outside these establishments into the interior of the peninsula used the navigable rivers, the Delaware River and its tributaries, and the Christina River. There were also four rudimentary land routes in existence at the time of European contact, established Indian paths traversing the Delmarva peninsula. The Minquas "Road", named after the local resident Indian tribe, provided an overland connection between the Susquehanna River and Christiana Creek. A second path journeyed between the present site of Lewes and moved northwest across the peninsula to the Chesapeake Bay. A third trail ended at the upper Chesapeake Bay and started at Appoquinimink Creek. The fourth trail followed the Delaware River from a point north of the site of Philadelphia south to Christiana Creek.

In the seventeenth century, Delaware's waterways offered convenient transport to waterborne travelers, but presented an obstacle to those journeying by horse and wagon. Most bodies of water were unbridged, requiring travelers to ford the streams or cross by boat. George Fox, traveling through northern Delaware in 1672, described such a crossing of the Christiana River: "got over the river Delaware, not without great danger of some of our lives . . . we came to the Christian River, where we swam our horses over, and went ourselves in canoes". Jasper Danckaerts, arriving on the bank of the same river in 1679, found the same conditions: ". . . coming to . . . Christina Kill, we found . . . the water was so high that it was not advisable to ride through it with horses, and we would have to wait until the water had fallen sufficiently for that purpose. While we were waiting . . . an Indian came on the opposite side of the creek . . . He said that we should have to wait there too long; but if we would ride a little lower down, he had a canoe in which he would carry us over, and swim the horses across. We rode there at once, and found him and his canoe. We unsaddled the horses, and he swam them over one by one, being in the canoe and holding them by the bridle. When we were over, we quickly saddled them and rode them as fast as they could run, so that they might not be cold and benumbed."

Seventeenth Century Roads

The advent of English rule in 1664 established the importance of building a good transportation system in Delaware. Authority was given by the Duke of York to the Governor to issue warrants to district justices of the peace for road "labourers and artificers". The European settlers became involved in building their first major land route from Augustine Hermann's plantation on the Bohemia River in Maryland to New Castle in 1671. The residents of the plantation needed a road to New Castle and contributed half of its construction. Delaware residents were

responsible for the remaining portion as directed by the Court of the Duke of York. Built without specifications, the narrow path was a precursor to the mandated King's Roads.

The building of roads in the colony was fostered by a 1673 ordinance of Governor Anthony Colve, giving authority to sheriffs and schepens to build roads for the "welfare and peace of the inhabitants of their districts". Legislation was passed in 1675, requiring "each family to contribute one able-bodied to work on the construction of roads". As a direct result, the King's Highway, which linked New Castle and Philadelphia, was completed in 1677, the first public road in Delaware. In 1679, regulations for the King's Highways were promulgated. The second road ran from Naaman's Creek to Wilmington, turned south to New Castle, and proceeded to Red Lion, Lewes and Cape Henlopen. A branch ran from the present town of Milford to Seaford. In 1682 William Penn authorized the Governor and Provincial Council to administer public roads from site selection to construction. The following year Penn instituted a policy whereby county courts were required to appoint overseers for road construction. By 1684, another route passed from Wilmington to Newport, south to Christiana Bridge and beyond to join the earlier road at Red Lion; a branch of the second road ran west from Christiana Bridge and ended at the Elk River. By 1700 there was legislation requiring the recording of road alignments and maps in Council books.

A Growing Network in the Eighteenth Century

The King's Roads were built to specifications outlined in the law. The road requirements included a width of ten feet, maintained bridges, groomed shrubbery, and marked trees. Fines up to 1000 pounds of tobacco could be levied if the overseers failed in their obligations. More exact specifications were legislated in 1752 that widened the post roads to forty feet with no more than 10 feet of uncleared land. Common roads typically had a width of thirty feet. This legislation authorized the justices of the peace of each County Court of General Sessions to supervise the design of a road, the nomination and appointment of overseers, the purchase of trees for bridge building and the levying of taxes. However, private citizens were responsible for maintenance and repair for roads "which are not properly King's Roads".

By the mid-eighteenth century, Delaware had a distinct network for land transportation. The principal route of the peninsula was a north-south passage, which began at New Castle, split into an upper and lower road to Blackbird, continued south to Salisbury and Dover, then split again into high and low paths and rejoined at a point just north of Mispillion Creek. From there, the road proceeded to Lewes and terminated at Cape Henlopen. Two major east-west routes could be traveled: 1) Dover west to Maryland's Choptank River, and 2) the Bohemia Road from New Castle to Maryland (1737 map).

Traffic increased enough during the mid-eighteenth century to justify wider thoroughfares. In 1762, just ten years after the previous expansion, the King's Roads were designed to be sixty feet wide with a cleared width of forty feet. Several additional roads were authorized in this legislation as well, including a new road constructed between New Castle and Christiana Bridge, built according to the specifications above.

While early travelers' accounts occasionally mentioned bridges as points along their journeys, the early Delaware travelers only noted them in passing, with little descriptive detail. In 1744, Dr. Alexander Hamilton reported "passing over a toll bridge in bad repair at a place called Brandywine". Forty years later, Johann

David Schoepf observed "near to Wilmington the Brandywine is crossed, over a good stone bridge". These comments are among the more detailed observations encountered in travelers' diaries. Wilmington was served by bridges in the vicinity of the present North Market Street and Church Street crossings as early as the 1760s.

The Christina River, and the creek which flows into it from southeastern Pennsylvania, were often-mentioned topographical features in the early period. The Christina system presented an obstacle to some, such as the seventeenth-century travelers whose accounts were quoted above, and an opportunity for others, as it provided a valuable means of water transport. A reference in the Diary of Joshua Hempstead of New London, Connecticut suggests that an aqueduct crossed the Christina Creek as early as 1749: [at the] "head of Christeen Creek . . . a River runs in a Bridge over it."

Expanding and Improving the Colonial Network

(Delaware Comprehensive Plan Periods 1770-1830)

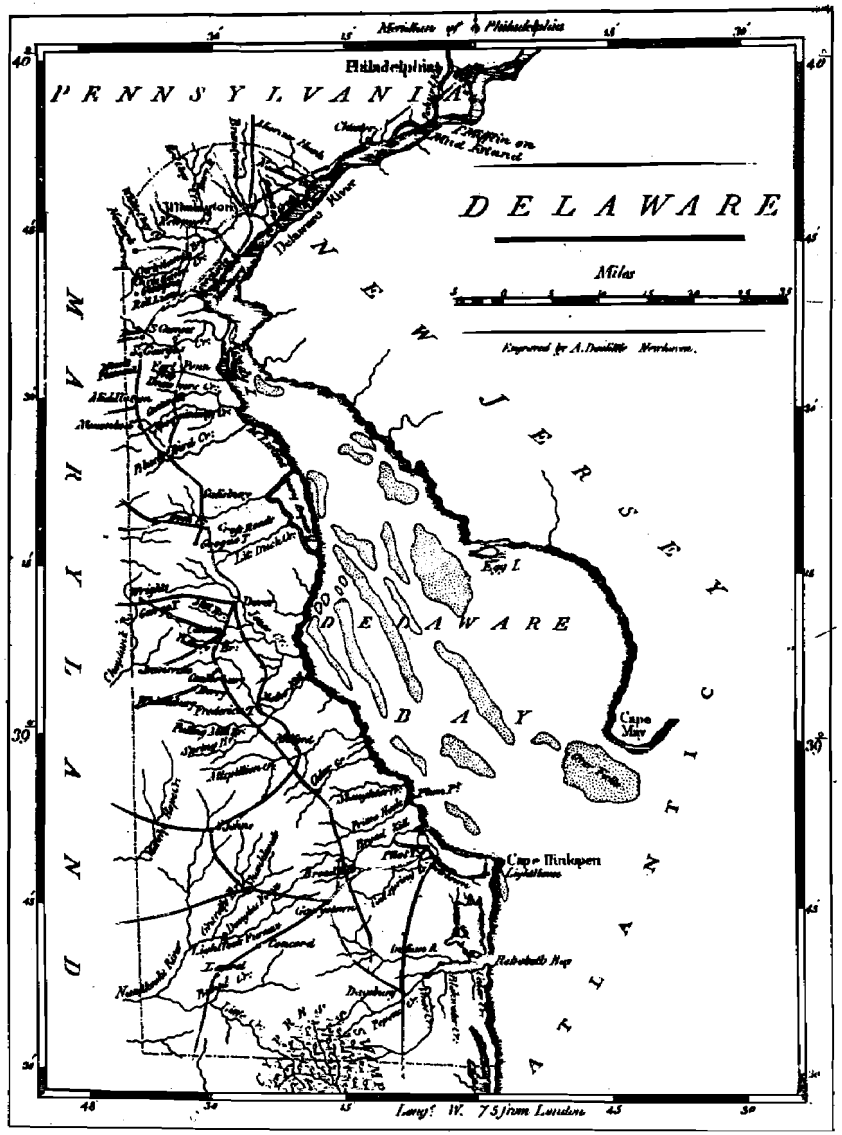
In comparing the historic road patterns to current ones, it is clearly evident that the framework for today's system was established as early as 1800. Comparison of a late twentieth century road map to an 1800 map, on the following page, reveals distinct similarities between the two road networks. On both maps, the principal route is a north-south one, along the same general alignment. Beginning in Chester, Pennsylvania, the nineteenth century road traveled to Wilmington with a tangent to New Castle. From Wilmington, the road continued southward and split just north of St. George's Creek (near the Chesapeake and Delaware Canal), merged at Blackbird and proceeded south to Dover. Two routes proceeded from Dover to Milford, joining into one path just south of Milford, and continuing to Georgetown and " Dagsburg". An east-west route led from Georgetown to either Laurel or Lewes, and roads leading west from Dover were also evident.

Thus, at the close of the eighteenth century, Delaware could boast of a continuous state route from its northern border to its southern border. After the realignment of the north-south route in Kent and Sussex Counties in 1796, the Old State Road was completed. The map dating from 1801 identifies two types of roads: post roads and common roads. The post roads were the more heavily travelled roads, linked communities, and generally paralleled the prominent waterways. The common roads traversed the entire state and connected less populated areas. At that time, Delaware residents continued to use both overland and water transportation methods. Small vessels, called shallops, worked well in Delaware's shallow rivers and creeks. Water transportation offered a slower method of travel even though the roads were sometimes poorly maintained. Upkeep of roads and bridges suffered because enforcement of maintenance responsibility was difficult, rendering the roads sometimes impassable in poor weather. Despite this fact, roads still offered the fastest method of travel, although not the cheapest, nor the most comfortable. The existence of Delaware's roadway network contributed greatly to the development of commerce; with the roads, the farmers and traders were able to deliver their products to various markets such as New Castle, Philadelphia and Baltimore. Growing commerce provided a strong incentive for expansion and improvement of the existing network. That improvement and expansion occurred during the first half of the nineteenth century.

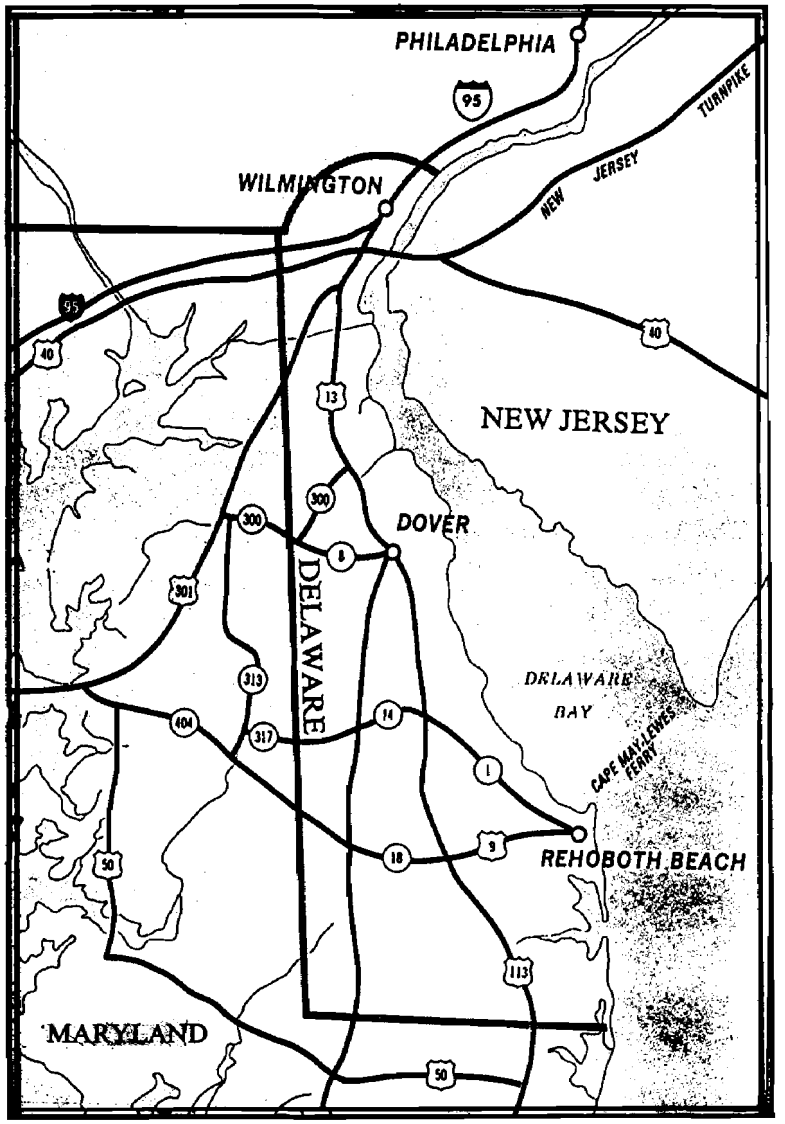
Private Roadways: The Turnpike System and Toll Bridges

The first improvement in the transportation networks during the nineteenth century focused on a network

EARLY ROADWAYS



Map of the state of Delaware from 1800 showing early road development.



Portion of 1988 Official State Highway Map of Delaware showing major roads roughly corresponding to early road system.

of private roads, or turnpikes. These roads were planned to decrease travel time and provide direct routes between ports and towns, on roads which were more reliablein all weather. The turnpikes were roads built, operated and maintained by a private corporation. A group of individuals was granted the authority by the state to sell stock in a turnpike company which would generate funds for the construction of the road. Tolls would be charged to cover the cost of road maintenance. These turnpikes were also sometimes termed hard roads because the road surface was bedded with stone (MacAdam's mixture of stone dust and water) or planked by wood ("plank" roads, consisting of timber stringers surfaced with timber planks) instead of the previously built exposed dirt surfaced roads which turned to mud in bad weather.

The Delaware General Assembly granted charters to the turnpike companies which established the framework of the companies' organization. Seven officials were permitted: one president and six managers. The managers sold stock ranging in price from $25-50 with the first $5 attributed to financing organizational costs. The stockholders paid the remaining sum required for financing at the start of construction. Their return was limited to dividends of seven and a half percent.

The turnpike companies were required to complete road construction of two and a half miles before they were licensed to erect toll gates and collect fares for the use of the road. The license was contingent upon the approval of an inspection committee appointed by the governor. The committee inspected the highway for proper construction and, when satisfied, issued the license. Frequently, turnpike companies collected tolls for several years before the completion of the entire road.

Certain regulations were promulgated to regulate the tolls. The law required that each turnpike company post the charges at the toll gate. The toll was determined by the wheel size of the vehicle, the number of horses and the number of animals being driven along the road. The number of passengers, and the type of freight or the lack of it did not affect the toll charged. The companies could levy fines of $10 if either a toll gate or milestone was defaced. The turnpike companies, themselves, were also liable for fines if the road fell into disrepair. Upon notice of unsatisfactory maintenance, the road would remain free for fifteen days; if the repair was not complete, then the company received a $100 fine.

Numerous turnpike companies emerged during the first quarter of the nineteenth century to cross the northern section of the state. The Delaware General Assembly chartered its first turnpike on January 30, 1808, authorizing the construction of a road from Newport to Gap Tavern, Pennsylvania where it would connect with a toll road to Philadelphia. The Newport-Gap Turnpike represented an important commercial link between Lancaster County, Pennsylvania and New Castle County, Delaware. This turnpike, sometimes referred to as Lancaster Pike, provided a maintained and direct route between the farms of Lancaster County and the ports of Wilmington and Newport. Access to these ports stimulated the economy of both areas. Specifications for the construction of that key commercial link called for "an artificial road bedded with road-stone, gravel, clay. . . compacted. . . to make a solid foundation, and faced with clay, gravel, or stone, in such a manner as to secure a firm or even surface, rising toward the middle by a gradual arch".

In 1809, the Delaware General Assembly authorized the New Castle and Frenchtown Turnpike Company to construct a road from New Castle to the Maryland-Delaware border. At the same time, the company also received a charter from the Maryland General Assembly to complete the route from the state line to Frenchtown on the Elk River, providing access to the

Chesapeake Bay. Construction of the turnpike was initially delayed but the first two miles were completed by 1814. This road provided an important transportation link for the region. Passenger vessels could dock at New Castle, where travelers could catch a stagecoach to Frenchtown and then board a ship to Baltimore and points south. Later, in the 1830s, the turnpike company was chartered to include a rail line in addition to the road.

Wilmington was the true beneficiary of the burgeoning turnpike network. The port of Wilmington became a common termination point of many turnpike companies. In an effort to connect the two cities and to take advantage of the exported grain from Lancaster County, a turnpike was chartered between Newport and Wilmington in 1811. The following year, the Wilmington and Kennett Turnpike Company received a charter to build a hard road between the Pennsylvania boundary (north of Centreville) and Wilmington. Eight miles long, the Wilmington and Kennett Turnpike opened in 1813. This turnpike was particularly advantageous since it provided a good, reliable network between Wilmington and the rich farmlands of the Delaware Valley.

Two additional turnpikes assured the success of Wilmington as a commercial center. Chartered in 1811 and completed in 1812, the New Castle-Wilmington Turnpike ran between present day Hare's Corner and the Wilmington Bridge Road. The second, the Wilmington and Great Valley Turnpike, provided an important connection between Wilmington, West Chester, Pennsylvania and the Great Valley. The company received its charter in 1811, and the Delaware portion was completed first; the entire roadway was completed in 1818. Fostering the transport of agricultural products between the farmlands in Pennsylvania and the accessible port of Wilmington, this important roadway underwent several changes on the Pennsylvania section in 1839. The Commonwealth of Pennsylvania rebuilt the section between the Delaware line and West Chester by eliminating the curves, adding a wooden surface and widening it to four lanes in the most frequently traveled sections.

The Wilmington-Philadelphia Turnpike, following the Old King's Road, extended from Market Street, Wilmington to the state line just east of Naaman's Creek to connect with a Pennsylvania turnpike. Completed in 1823, this turnpike took ten years to build and was one of the last turnpikes to be built in Delaware. The last successful turnpike charter was issued to the Christiana and Wilmington Turnpike Company in 1821; that turnpike provided a direct route between the two communities.

Although the turnpike companies were responsible for constructing bridges along their routes, road construction documents omitted detailed specifications for bridges along the routes. The minutes of the New Castle and Frenchtown Turnpike Company for 1813-1830 included detailed specifications for the construction of a toll house, but considerably less detail for bridges and culverts. Among the earliest resolutions of the company included "to contract for Stone and employ workmen to build a Culvert at the run below Clarks Corner at least four feet high and two feet wide fifty feet in length . . . (April 5, 1813)." This represents the most complete description of a structure of that type included in the specifications for the first phase of turnpike construction. For the most part, these structures seem to have been viewed by the managers of the company as noteworthy only insofar as their construction might delay the completion of the overall project. In 1814, they directed the contractor to employ whatever technology proved most expedient: "make the culverts of wood or stone so as not to delay . . . in progressing with the work." (January 18, 1814). At a subsequent meeting, the managers resolved "to repair the Bridge near [Fimesters?] and

the expense of such repairs to be paid out of the tolls." (March 10, 1815). On May 17, 1815, the company's accounts included an item of $52.00 for James Thompson "for Bridge at Bell Town," but when Thompson presented his statement for this work in April of the following year, the managers voted to postpone consideration of payment.

The majority of bridges built in the early nineteenth century for turnpikes were wooden bridges and stone arch bridges. Despite the extensive turnpike network in northern Delaware, few bridges known to be associated with those turnpikes survive today. A photograph of an 1805 stone arch bridge on the Concord Pike is included in Delaware Department of Transportation photographic archives for New Castle County and is reproduced below.

All of Delaware's turnpikes were constructed in New Castle County because the economy and trade could support these commercial ventures. New Castle County developed into a commercial and industrial center while the economies of Kent and Sussex Counties remained rooted primarily in agricultural pursuits. Delaware's early turnpikes totaled approximately 65 miles at an estimated cost of $3000-$4000 per mile. They fostered the economic growth of the state by providing viable transportation, and social and cultural links between the interior farms and the port cities.

Other public improvement projects were undertaken by private companies as well, during the nineteenth century. For example, the Brandywine Bridge Company was incorporated in 1806 to construct a new bridge across the Brandywine River. The opponents of the bridge argued that the navigation of the river would be disrupted. Upstream merchants were also concerned about the diversion of river traffic from their establishments. These concerns did not prevent the Brandywine Bridge from being built but the opposition was able to prevent a bridge across the Christina River at Wilmington and Newport during that period. In 1807, a proposal for a bridge across Christina Creek above Wilmington elicited the following opposition:

> "this very reprehensible Scheme will . . materially obstruct the free navigation of the Christiana Creek . . ."; much Susquehanna valley produce was "annually transported down the said creek by shallops, to the great market at Philadelphia, and great quantities of goods and merchandize are returned thence on back freight, and distributed . . . through the interior parts of the Country. . . . The erection of the Proposed Bridge will interpose such an impediment in the Navigation of the Creek, as greatly to prejudice, if not entirely to ruin and destroy it."

The argument continued that shallops would only be able to pass under the proposed bridge at slack tide, causing a bottleneck as shippers were forced to wait for favorable conditions. Furthermore, "no plan on which a Drawbridge can be constructed will relieve the inconveniences and delays mentioned". It was asserted that the real purpose of the proposed bridge was to create just such an obstruction to shipping, stopping produce-laden shallops bound for Philadelphia markets at Wilmington and forcing development of that city as a market center.

Public Roadway Improvements

Despite the proliferation of the turnpike network in New Castle County, two-thirds of the state continued to rely on public roads.

1805 Stone arch bridge on Concord Pike. From photographic archives for New Castle County. No longer standing.

The public road network at the beginning of the turnpike revolution consisted of the principal north-south route with passages (1812 map) through Wilmington, Dover, Milford, Georgetown and "Dagsborough". All three counties had built secondary routes to accommodate east-west travel. By 1827, the principal north-south route had split into two routes, one heading southeast from Dover to Dagsboro and the other southwest from the Capitol to Laurel. Both roads extended into Maryland. Because of its location and the emergence of the turnpikes, New Castle County developed an extensive east-west network while Kent and Sussex Counties maintained limited public roads in any direction.

In 1832, the Delaware General Assembly passed legislation which mandated the election of a road commissioner for each hundred in New Castle County. These commissioners would, in turn, appoint overseers to supervise the design, construction, and repair of county roads and bridges. Until 1832 such officers were appointed by the Levy Courts, as the need arose. Both Kent and Sussex continued to operate on the existing system, whereby the county Levy Court appointed road commissioners when the need for new roads surfaced.

Originally established by the Dutch in the 17th century, the Levy Courts have served as a means of taxation and governmental authority. One responsibility of this authority was to review petitions for public work projects, wherein "sundry citizens" would petition the court for a specific project which would directly benefit them. The Levy Court would review the road or bridge petition and then appoint viewers to inspect the site and submit a return for the court to review. At that time, the court would make a final decision on the project. The road petitions often included provisions for bridges but usually no specific information about the structure was included. A similar procedure occurred through the Court of General Sessions. Private citizens would submit a petition to the court for a bridge and/or road. The Court would appoint five freeholders to view, examine the site and recommend an action. If the bridge was approved and constructed, the court had a responsibility to maintain the bridge by appropriating funds when repairs were necessary. Local residents were the overseers for these projects.

A Period of Stagnation for the Roadways: The Emergence of the Canals and Railroads

(Delaware Comprehensive Plan Periods 1830-1880)

Little change in the mileage of public roads occurred in the second quarter of the nineteenth century. Several maps of the period illustrate the growth of rail transportation and the stagnation of the road network between 1825 and 1876. It is clear from these maps that the railroad lines flourished during this period. Initially, many rail lines paralleled existing roads, but as the rail industry prospered, new lines emerged.

The Wilmington-Kennett Pike was the longest operating turnpike in the state. The last toll was collected on April 30, 1919 prior to its sale to Pierre S. Du Pont. The road was in a poor state of repair, the company was financially troubled, and the county was reluctant to assume responsibility for the road. Du Pont rebuilt the road, declared free access to it, and then gave it to New Castle County.

When Du Pont bought the Wilmington-Kennett turnpike, the purchase eliminated the last vestiges of the Delaware's nineteenth century private road era. By the mid-nineteenth century the turnpikes had been surpassed by other modes of transportation: canals and railroads.

The Chesapeake and Delaware Canal

The early transportation networks of the

seventeenth and eighteenth centuries recognized the importance of linking the Chesapeake Bay and the Delaware River. Both the Indian paths and the early King's Roads provided a connection between these two great waterways. Concepts for a canal between the Chesapeake to the Delaware were entertained as early as 1654 by the Swedes. Land surveys to determine a possible course for the Chesapeake and Delaware Canal began over a century later in 1786. Incorporated in 1803, the Chesapeake & Delaware Canal Company chose a route and began construction the following year. The Company encountered financial difficulties and malaria epidemics during the construction period, delaying the canal's completion until 1828. The final cost of this intercostal waterway totaled $2,250,000. The canal originally consisted of three locks, each 100 feet long and 22 feet wide with a depth of 10 feet. The canal has been enlarged twice in its history, once in 1855 and again in 1935. Its usefulness has been proven throughout the years, and it is one of the only canals originally built in the nineteenth century still in operation today.

The canal has been the site of numerous impressive bridges from its earliest period. A work of civil engineering impressed Henry Tudor in 1833: "across the [Chesapeake and Delaware] Canal, at the greatest elevation of its embankment, is thrown a bridge of singular appearance and ingenious construction, rising to the height of nearly ninety feet above the surface of the water."

The Railroads

In Delaware, the most direct challenge to the efficiency of the turnpike system came not from canals but from railroads. The railroads quickly proved superior to turnpike travel, and dominated the Delmarva peninsula in the last half of the nineteenth century.

The history of rail transportation in Delaware began in New Castle County. The New Castle and Frenchtown Turnpike Company, one of Delaware's first turnpike companies, chartered in 1811, was also the first railroad corporation organized in the state. In 1827, the company was authorized to construct a railroad roughly parallel to the route of its turnpike; following several reorganizations and name changes, the New Castle and Frenchtown Turnpike and Railroad Company began operating its seventeen-mile horse-drawn railroad between New Castle and a wharf on the Elk River below Frenchtown in 1831. Late in 1832, a steam locomotive imported from England was placed in service; this introduction of heavy steam equipment required that the entire track be rebuilt. The railroad operated for twenty years, providing a link with steam packet boats traversing the Chesapeake Bay from Frenchtown to Baltimore.

This early effort proved the feasibility of rail transportation in the region, and stimulated interest in a direct rail link between Baltimore and Philadelphia. Four small lines were subsequently developed, consolidating in 1837 as the Philadelphia, Wilmington, and Baltimore Railroad.

The Wilmington area saw steady increases in rail service: the New Castle & Frenchtown Railroad established a link between New Castle and Wilmington in 1854; the Wilmington & Northern Railroad reached Birdsboro, Pennsylvania in 1870 and continued to Reading in 1874; and the Philadelphia Division of the Baltimore & Ohio Railroad opened through Newark and Wilmington in 1884. The city's status as a commercial and industrial center was solidified by its position on major railroad lines. A portion of an 1874 map of Wilmington is shown on the following page.

The second quarter of the nineteenth century brought hard economic times to the farmers of lower Delaware, as soil exhaustion began to take its toll. Two complementary developments during that

EARLY ROADWAYS

1874 birds-eye view map of Wilmington. Note railroad in front center and two movable bridges spanning Christiana River.

period began reversing this trend. Scientific agricultural methods, promoted by organizations such as the Agricultural Society of Kent County, gave farmers hope of renewing the productivity of their fields; and the introduction of steam-powered freight vessels in the 1840s reduced the costs of shipping bulky items like fertilizer and grain. By the 1840s, regular steamboat service had been established between the river ports of Smyrna, Dover, Lebanon, and Milford and the markets of Wilmington and Philadelphia.

The western part of lower Delaware lacked convenient access to water transport, hampering its economic development. In 1836, John M. Clayton resigned from the U.S. Senate to promote the development of a north-south railroad running through this region, serving not only western Delaware but adjacent Maryland as well. The General Assembly granted a charter in that year for Clayton's Delaware Railroad, but only preliminary surveys were accomplished before the charter lapsed owing to insufficient subscriptions. The effort to establish a railroad through this region was revived in 1849 by Chief Justice Samuel M. Harrington, but again failed for lack of support. Construction finally began in 1852, after the General Assembly agreed to provide half of the necessary funds; the first section of the Delaware Railroad extended to Seaford from a junction with the New Castle and Frenchtown Railroad at Porter.

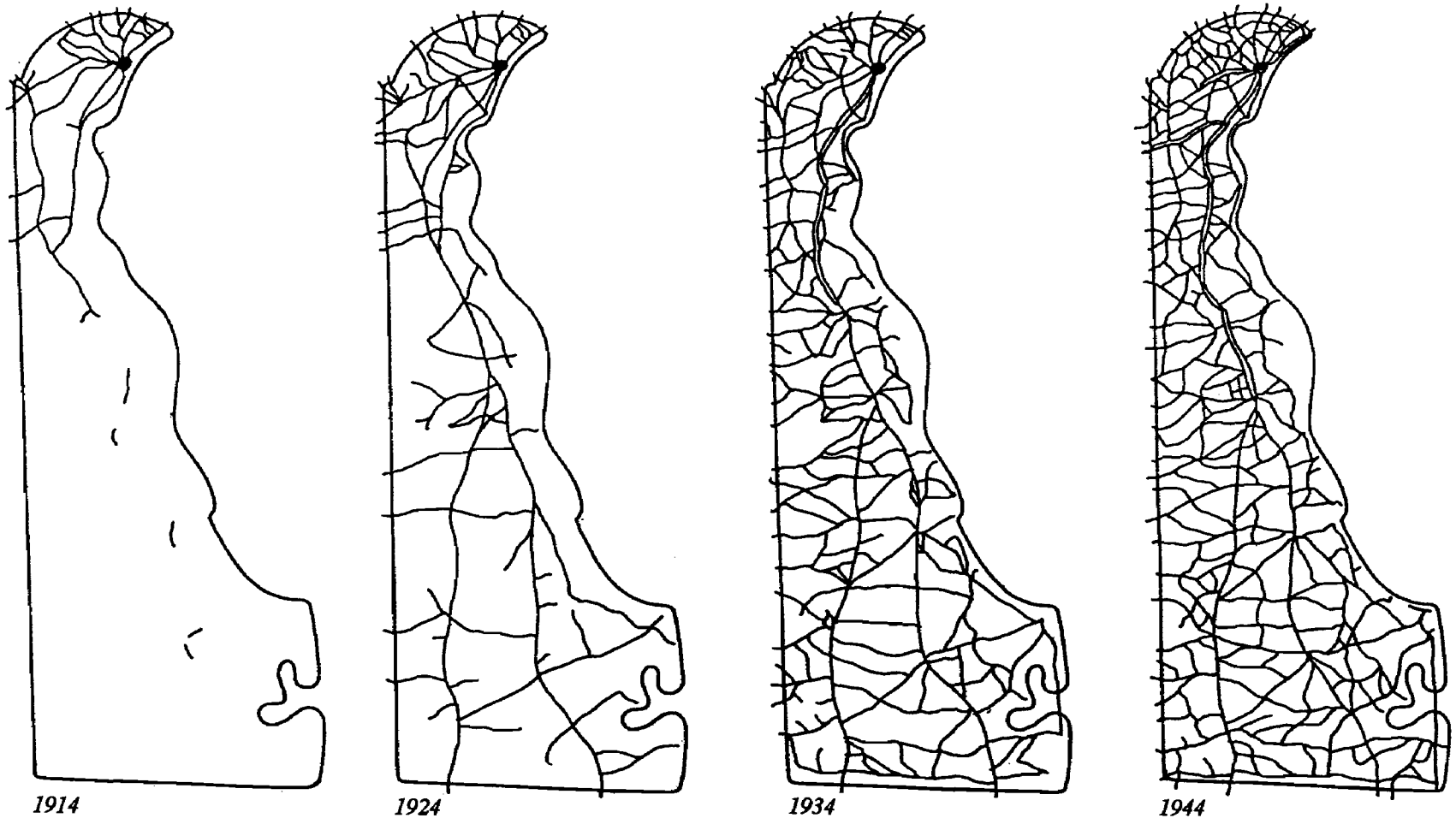
The period 1850-1870 was marked by the expansion of the rail network through southern Delaware. A branch line of the Delaware Railroad from Harrington to Milford was begun in 1857 and completed in 1859. The main line was extended from Seaford to Delmar in 1859, establishing a connection with the Eastern Shore Railroad to Salisbury, Maryland, and by 1866, through Salisbury to Crisfield on the Chesapeake Bay. In 1867, another branch of the Delaware Railroad was established from Seaford westward to connect with the Dorchester and Delaware Railroad running to Cambridge, Maryland. The Junction and Breakwater Railroad was completed from Milford through Georgetown to Lewes in 1869, and a branch line was extended to Rehobeth Beach in the 1870s.

The development of railroads in lower Delaware during this period had wide ranging effects. New towns sprang up along the railroad line, including Harrington (formerly Clark's Corner, renamed to honor the principal promoter of the railroad, Samuel M. Harrington), Clayton, Cheswold, Wyoming, Hartly, Fenton and Farmington. The speed with which railroads reached markets encouraged great diversification in agriculture, and farmers began to experiment with perishable crops which were formerly impractical. Peaches became a major product of lower Delaware in the late 1850s, and other crops, notably strawberries, also gained in importance after the Civil War. The hardwood forests of western Sussex County were timbered extensively. Local roads, which formerly served to reach water ports, began to be improved in the early 1860s to provide access to railroad stations.

By the 1870s, about a dozen rail lines were in operation on the Delmarva Peninsula; these disparate organizations were consolidated into the Delaware, Maryland and Pennsylvania Railroad in the 1880s. Consolidation resulted in expansion, modernization of their facilities, and their increased service for both passengers and freight. The conglomerate later became known as the Pennsylvania Railroad.

Although steamboats continued to compete with the railroads into the early twentieth century, offering cheaper rates for certain freight shipments and passenger services which included excursions to the Bay resorts, rail transportation surpassed it and eventually established a virtual monopoly on long distance transport in Delaware in the last quarter of the nineteenth century.

MODERN HIGHWAYS



FOUR MAPS ILLUSTRATE THE GROWTH OF DELAWARE'S IMPROVED HIGHWAYS

MODERN HIGHWAYS: THE URBANIZATION AND EARLY SUBURBANIZATION PERIODS

The Early Years from 1880-1916: Bicycles, Horseless Carriages and Good Roads

The development of the bicycle and automobile near the turn of the twentieth century stimulated public interest in road improvements, promoted through the American "Good Roads" movement. This crusade had been initiated in the 1870s by various factions, among them proponents of improved farm transportation and a growing number of bicycle enthusiasts. The movement spread throughout the country, found strong support among bicycle manufacturers and dealers, many of whom, by the early 1900s, became automobile manufacturers. As the automobile began to gain widespread acceptance, the cause was taken up by automobile clubs and motor vehicle dealers. Proponents delivered lectures, published promotional articles, and engaged in lobbying for improved roads. The movement won the notice of such leaders as William Jennings Bryan and President Theodore Roosevelt, both of whom attended the National Good Roads Convention at St. Louis in 1903. Delegates to this convention endorsed state and federal aid for road and highway maintenance and construction. Among Delaware's most vocal proponents was T. Coleman duPont, an active member of the National Highway Association, who became its chairman.

Early Attempts to Improve the Roadways

The Delaware General Assembly responded to this increasing public concern by enacting rudimentary vehicle regulation and registration acts in 1903 and 1905. With foresight to a state highway department, the State Aid Road Law was enacted in 1903, the same year that the first Good Roads Convention was held. This first road construction law in Delaware provided $30,000 for roads annually in matching funds, with $10,000 to each county. With headquarters in Dover, branch offices were provided in Wilmington and Georgetown; and each county was to have its own commissioner. The new Commissioners reported, in their first year, that eight miles were constructed in New Castle County, one mile of road was paved in Sussex County, and none in Kent County using these funds in 1903.

The State Aid Road Law remained controversial within the legislature, and was repealed in 1905, scarcely two years after its enactment. Thus, ended Delaware's first attempt to bring the main roads under state control. Efforts to institute federal action on the road problem were even shorter-lived. Among them, the Brownlow-Latimer Federal Good Roads Bill, introduced in 1903, died in committee. The Delaware General Assembly remained reluctant to centralize its road system, and neighboring states outstripped Delaware in road improvements. In Maryland, for example, the Shoemaker Act went into effect in February 1905, appropriating $200,000 annually in state funds to provide matching grants to counties for road construction. Public interest in automobile travel grew steadily, however, and citizens throughout Delaware increasingly called for state participation in road building programs.

From 1905 to 1916 the counties carried on their own road programs. New Castle County developed modern standards; this increasingly-urbanized industrial and commercial center of the state built nearly 73 miles of improved roads by 1908, at a cost of approximately $537,000. Improved road mileage in the

county increased to 110 in 1910, 138 in 1912, and 220 miles in 1916. By 1917 Sussex County had 35 miles of surfaced roads and Kent had 19 miles.

The growing importance of automobile transport is reflected in early efforts toward its regulation. In 1905, the first motor vehicle registration law went into effect in Delaware, and driver's licenses became mandatory two years later. A total of 313 cars were registered in the state in 1907, the number approached 1000 by 1910, and 7,000 by 1916.

Funding from an Unusual Source: The Dupont Highway

In 1908, in an effort to demonstrate the value of an improved highway system, General T. Coleman duPont offered to construct a modern highway the length of the state. His plan forecasted the trunk system with its ancillary spur roads, later to be developed under the auspices of a statewide highway department. The DuPont Highway was entirely conceived and financed by T. Coleman duPont, who offered in 1908 to organize a corporation to construct a visionary superhighway which would connect the industrial north to agricultural southern Delaware. DuPont, an 1885 graduate of M.I.T, and active proponent in the American "Good Roads" movement, proposed a futuristic super-highway from Wilmington to the Maryland border. DuPont was a serious student of roadways, and had studied the issues involved in creating a "road of the future" throughout Europe and the United States. He envisioned a highway of grand scale for Delaware, "the straightest, widest, and best road in the country". Initial plans called for a multi-modal layout, with central lanes for high-speed automobiles, and flanking lanes for trolleys, heavy motor freight, horses and horse-drawn vehicles, and pedestrians. Airfields were to be located at intervals within the median strip, agricultural experiment stations would be spaced along the way, and electrical conduits were to run underground. Unused land within the broad 200-foot right-of-way was to be leased to utilities and other enterprises, including farmers, to enable the highway to be self-supporting. DuPont would bear all costs of construction, and turn the road over to the state upon completion. The Boulevard Corporation Act was passed by the General Assembly in 1911. The Act authorized the corporation, known as Coleman duPont Road, Inc., to construct a highway the length of the state. As each section of ten miles was completed, it was to be conveyed to the state free of charge. DuPont hired two consulting engineers of international renown, Thomas Aitken of Scotland and Ernest Storms of Belgium, and duPont himself was chief engineer, until he gave that responsibility to Frank Williams, former Chief Engineer of the New York Highway Department.

The DuPont Highway, US Route 13 in New Castle County, 1930.

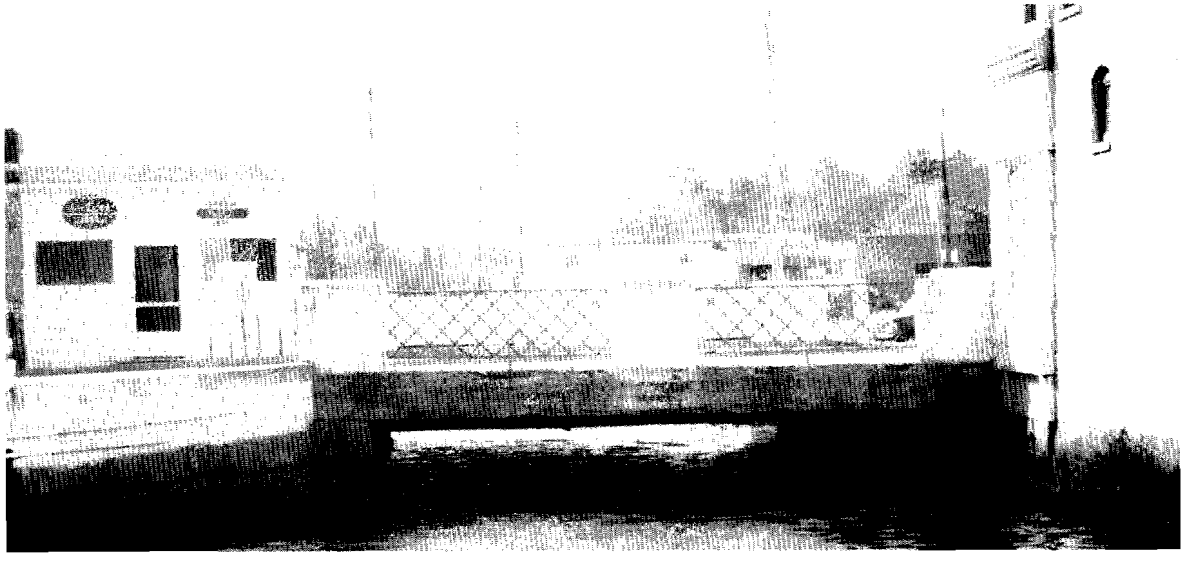
With roads which were practically impassible in bad weather, construction began with the southernmost section, in Sussex County in September 1911. Litigation concerning condemnation and right-of-way purchase interrupted construction from 1912 to 1915, but the first 20 miles of the road, from the Maryland Line near Selbyville to six miles south of Milford, was completed and presented to the State on May 24, 1917.

Although not executed as envisioned by duPont, the highway was still an example of the most modern highway designed in a state which previously had only 8% improved roadways. One of the primary insights which duPont had and which saw execution in the completed highway was the concept of a bypass. Du Pont proposed in 1908 that his trunk road should bypass towns and be connected to them through spur roads. The public thought his idea ridiculous, and worried that it would hurt business. After its execution, his idea took root in the highway department, which said in a Department report dating 1917-1920, "In many instances it is better to have the trunk roads laid out near the towns rather than through the towns". DuPont's vision was true; his highway was so successful as a trunk line for the rapidly increasing motor traffic, that it quickly became overburdened with traffic. Widenings were reported as early as three years following its completion. A photograph of the DuPont Highway from the 1930 Highway Department Annual Report appears on the preceeding page.

A Lack of Institutional Funds and Slow Progress

Apart from the DuPont Highway, Delaware saw slow progress in road improvements during the years through 1916. The end of the period saw no complete inter-county routes, and only the beginning of a privately financed through-road in the state. Escalating traffic generated increased wear on the roads. There were 3,050 motor vehicles registered in Delaware in 1914; three years later, that number had more than tripled to 10,702. Lacking state support, county roads were primarily financed by local real estate taxes. Progressive rural communities with good roads were often providing transportation for urban and out-of state users, who contributed little to their maintenance. With control at the local level, it was difficult to plan or maintain roads which were useful to the whole state. That would not be possible until the roads were under the control of a statewide agency.

Only a few bridges constructed prior to 1917 remain in service on Delaware highways. There are two steel girder bridges on masonry substructure (Bridges 505 and 809, which is illustrated below), three bridges constructed on the early



State Bridge 809.

portions of the DuPont Highway (Bridges 404S, 504S, and 508S), a concrete frame (Bridge 200), and three concrete arch bridges (Bridges 337, 383 and 698).

1917-1934: ESTABLISHING A STATE HIGHWAY SYSTEM

The passage of the Federal Aid Highway Act in 1916 set in motion a series of changes which would greatly accelerate the pace of road improvement in Delaware. The Act provided matching funds for road construction up to 50% of cost or $10,000 per mile, and required that states set up an authoritative highway department with a professional staff. In response, the Delaware General Assembly passed the Highway Act of 1917, creating the Delaware State Highway Department. The Department was given the authority to build and maintain a permanent highway system, and to issue bonds for financing construction. It was determined that the Department would take over, and maintain, only the roads it built and the newly built duPont Boulevard. The Highway Act gave supervisory power to five commissioners, consisting of the Governor and four appointees. Coleman duPont was appointed to the Highway Department Commission and relinquished control of the construction of his highway.

Early Planning: The Trunk Routes

In its first year of operation, the Department made great progress in planning the "State Road System", a network of trunk roads in a new state highway network. Locations of towns and existing roads were mapped; over 170 miles of road were surveyed and improvements to their alignment were plotted; detailed plans were completed for 50 miles; and vehicular and railroad traffic counts were conducted to assess the present and future needs for road and rail traffic throughout the state. After analyzing this information, the Department recommended to the Governor that first priority should be granted to the establishment of a north-south trunk route through Delaware, linking the county seats and larger towns, and providing road access to rail terminals. The specific route ran north from Delmar to Dover, providing access to the towns on the railroad in the western part of the state. Another recommended road began at Selbyville, to link the railroad towns in the east, and connected with the Delmar-to-Dover road about a mile south of the capital. A third spur was proposed beginning in the vicinity of Rehoboth and running near Lewes and Milton to Milford, where it would join the Selbyville route. These three roads correspond approximately to present Routes 13, 113, and 1, respectively.

A trunk route was recommended between Dover and the northern part of the state; the first segment of this road would run north from Dover to Blackbird, about six miles north of Smyrna. At that point, the Department recommended two northerly routes, to link population centers in the eastern and western areas of the state. One was proposed to pass through Odessa, St. George's, and Red Lion to Wilmington; sixty-nine miles of this route were to be constructed with private funds, under T. Coleman duPont's agreement with the Department for the completion of the DuPont Highway. The other branch was to go to Newark via Middletown and Summit Bridge. East-west roads in the area were recognized as desirable, but afforded second priority. Wilmington was to become the nucleus of a "radial system", utilizing many of the existing alignments of turnpikes laid out in the nineteenth century.

The network thus described was presented to the Governor as the "rudimentary requirements of a State Highway System." Planning incorporated many ideas which represented the state-of-the-art at the time. For example, the trunk

routes were generally laid out to pass near established towns, rather than directly through them, to achieve reduced travel time and increased safety; a sixty-foot right of way for rural areas was proposed to provide for emergency needs (this recommendation, based on observations of military operations on French roads, reflected the wartime preoccupation with defense); within towns and villages, a right of way of eighty feet was suggested to allow for future improvements.

Completing the DuPont Highway

While the state planned the new network, its first trunk line continued to be privately constructed. However, in September 1917 duPont, having been appointed to the Highway Commission which supervised the newly formed State Highway Department, saw a possible conflict of interest in continued involvement in acquisition and planning the rest of the Highway. He turned over control for the completion of the road to the Department, but continued to underwrite the costs of finishing it, up to $44,000 per mile. The completion of the Du Pont Highway was marked by a celebration in Dover on September 2, 1924. A total of $3,917,004 in private funds was expended toward the realization of this visionary project.

State Initiatives: Tying the Arterial Communities to the Trunk

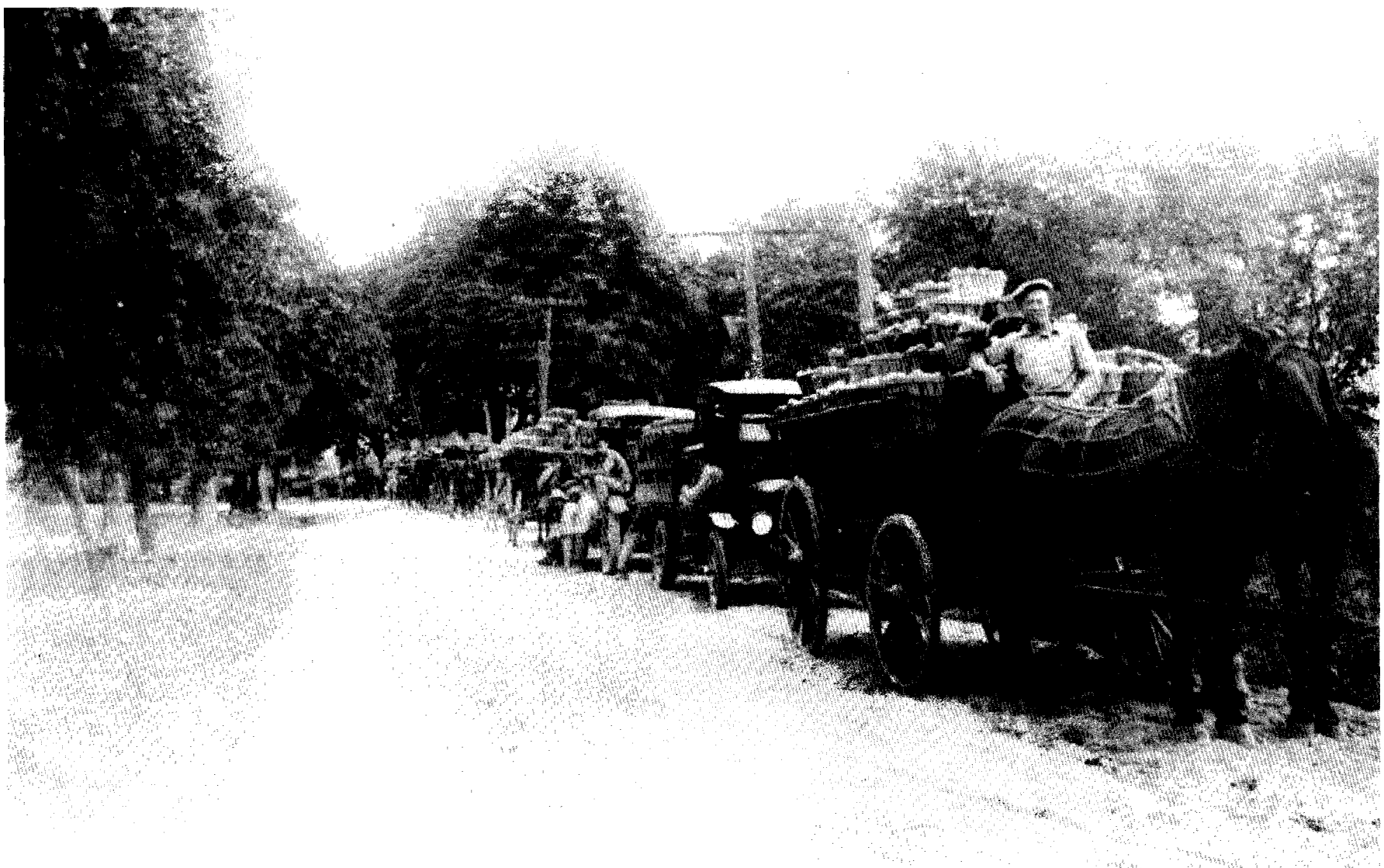
The public road building program was further stimulated in 1919, when the State Aid Road Law enabled counties to issue bonds to match state funds. The 1919 law significantly increased the annual state assistance for county roads from $10,000 per county, as established in 1903, to $250,000. Sussex County was the first to take full advantage of this program, accepting $250,000, matched with a bond issue, to construct 58 miles of road.

The effect of federal and state initiatives was rapidly and widely felt. By the mid-1920s, every major town in Delaware was connected to the main highway system by a paved road. This profound change in Delaware's transportation landscape was described in an article published in 1926 by the State Agriculture Department Bureau of Markets. The description has special relevance to rural agricultural regions, which had lagged behind the urbanized northern part of the state in road improvements:

> "In 1916 it was a common sight to see a Delaware farmer driving to market through deep mud. Sometimes he was driving a double team. But in his wagon there was little better than half a load. When the roads were seas of mud he hauled half a load, either because he was afraid of getting stuck or because it was physically impossible for his team to pull any more. Half a load, like half a loaf, was of course better than none.
>
> In the space of ten years a striking change has taken place in Delaware. Where once there were hundreds of miles of roads that were by turns mud and dust, to say nothing of the in-between period when they were scarred with deep ruts and hard ridges, there now are hundreds of miles of smooth permanent highways that are open to traffic the year round. That this condition promotes not only the prosperity of Delaware but that of adjoining states is quite apparent. No longer do [protracted] wet seasons see huge quantities of perishable produce wasting in the fields."

The photograph on the opposite page shows farmers carting their apple wagons to market on a 1925 road.

MODERN HIGHWAYS



Apple wagons on a 1925 road, not yet improved by paving.

Paved highways and modern bridges accommodated not only the farmer's horsecart, but also the touring horseless carriage and the increasingly significant motor freight industry. Trucking companies had burgeoned during World War I, when railroads failed to meet the increased demand for shipping, and soon assumed a dominant role in freight transportation. The number of trucks on American roads increased more than tenfold, from 85,600 before the war to 326,000 by 1917, and over 1,000,000 by 1920. The development of pneumatic tires in the early 1920s stimulated further expansion of the industry, permitting higher speeds and heavier loads while reducing the wear to highway surfaces caused by solid-tired vehicles.

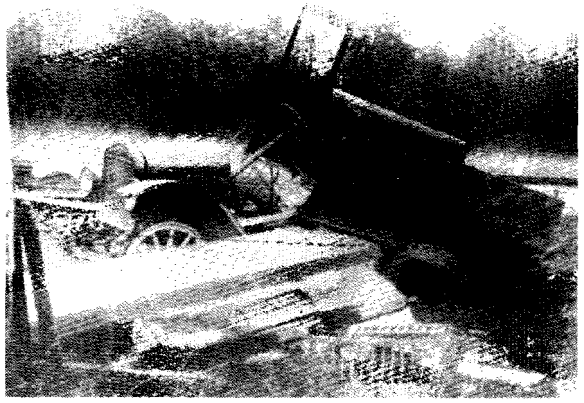
In 1923, Delaware enacted a motor vehicle fuel tax, which became the primary source of highway revenues. The period 1926-1935 was marked by the consolidation and improvement of the primary road system, and the development of the secondary system. Roads were widened to accommodate increasing traffic, and the first dual, or divided highways were constructed.

Beach Resorts, Highway Safety and Highway Improvements

Road and bridge improvements were also directed toward accommodating the needs of tourists destined for the growing resorts on the Delaware seashore. As the Delaware shore resorts began to benefit from increased visits by motor tourists, highway improvements were planned to provide easier access, and structures were upgraded to handle the anticipated traffic. For example, as the improvements to the road over the Broadkill River were planned in 1925, the existing bridge was deemed "quite unsuitable for the motor traffic the new highway leading to and from it will carry", and a modern movable structure was constructed to replace it. In 1928, plans were made for a bascule bridge over the Mispillion River near Milford, part of a major project to allow Rehoboth Beach traffic to bypass the Milford business district.

Efforts during this period were also directed toward improving road safety. Grade crossings posed a dangerous junction between railroad and highway traffic, accounting for thousands of fatalities in the United States in the first quarter of the twentieth century. In 1926, the Delaware State Highway Department began a systematic program of eliminating these hazardous crossings. The railroad companies acted in cooperation with the Highway Department to replace grade intersections with separated crossings. In some cases, grade crossings could be eliminated by relocating the road or the railroad tracks, or both, but this program generally involved the construction of overpasses or underpasses. One such structure was the Newport underpass which was opened in June 1929 with the State Highway Department and the Pennsylvania Railroad sharing equally in the $138,754.10 total cost. The photograph below, from the 1926 Annual Report, illustrates the "the grade crossing problem".

Many of the State Highway Department's most notable achievements during this period were movable bridges, which offered the advantage of providing a low-level highway crossing without interference to navigation. Many of



The "Grade Crossing Problem" as illustrated in the 1926 Annual Report.

Delaware's movable bridges were designed by the principals of the firm of Harrington, Howard and Ash of Kansas City, Missouri.(For more information on that firm see the Movable Bridge section). In Delaware, their work is exemplified by Bridge 393, a swing bridge crossing the Appoquinimink River at Odessa, constructed in 1928, and Bridge 688, a bascule span built in 1927 to carry South Market Street over the Christiana River in Wilmington. In addition, they were the consulting engineers for the Rising Sun Bridge over the Brandywine Creek (Bridge 1), the only through truss bridge identified within the state, constructed in 1928. A later reorganization as Ash, Howard, Needles and Tammen produced the bascule bridge carrying North Church Street over the Brandywine in Wilmington (Bridge 577, built 1932). All the movable bridges surveyed were built in the period from 1917 to 1934.

From this period of rapid growth the survey also includes twelve steel girder bridges, eight concrete bridges, and four timber spans, mostly uninspired, expedient designs. While most of the bridges erected by the State Highway Department during this period were utilitarian in nature, and embellished with standardized plans, several designs for unusually ornamented bridges were built. A number of monumental bridges were erected by the State Highway Department in the 1930s. Two were concrete structures, faced with brick and embellished with white marble trim, reflecting the style of the nearby new State Legislative Hall in Dover.

Other less monumental structures designed by the engineers of the Levy Courts and State Highway Department during this period show a similar concern for aesthetic effect. A number of small concrete slab and steel girder spans in northern New Castle County were faced with rubble masonry, in an apparent effort to relate to their rustic surroundings as well as to reflect the area's historic association with early turnpike construction.

Several similarly embellished bridges were built by the Levy Court of New Castle County in the early 1930's; examples include Bridge 69, which is shown below.

As the State Highway Department developed and extended the road network over Delaware, the counties continued to pursue road construction and maintenance both independently and in cooperation with the state. In 1931, for example, New Castle County's road program included about 19 miles of new roads, in which the Levy Court had appropriated $150,000. These were secondary roads, to be built 9 to 12 feet wide and paved with water-bound macadam

State Bridge 69, a steel girder bridge embellished to look like a stone bridge.

on a stone substrate. Additionally,, many roads were being reconstructed and resurfaced. A maintenance crew of approximately 100 men was at work on county roads. Nine bridges were also under construction in that year in New Castle County; many county bridges during that period were designed by Charles Dannenberg, who had left his consulting practice to join the county engineer's office. Kent and Sussex Counties did little in those years, but New Castle completed 200 miles of additional hard-surfaced roads since 1917.

1935-1945: CONSOLIDATING AND EXTENDING THE SYSTEM

In 1935 the State Highway Department took over all roads formerly maintained by the counties. The Department assumed responsibility for road and bridge construction, and maintenance for an additional 2,600 miles of state roads. The gas tax was increased in that year an additional penny to four cents per gallon, to cover the increased cost of maintaining the expanded system.

Between 1935 and 1942, the dual highway system was extended, many miles of narrow roads were widened, and progressive improvements were planned for 2,200 miles of dirt roads. The Department emphasized the improvement of these rural dirt roads by using local materials. The dirt road improvement program was ongoing,

Typical county roads on June 21, 1935. County roads were taken over by the State Highway Department on July 1, 1935.

and produced a network of all-weather roads for local area use. Over 450 miles of those roads were treated with a bituminous covering, and over 250 bridges were built during that period as part of the secondary highway system. A large part of those bridges included an increasing number of small creosoted timber spans in low-lying areas in the southern part of the state. To facilitate construction, the Department established a wood treatment plant in Newport to produce material for these utilitarian structures. An emergency program of bridge replacement following disastrous flooding in September 1935 confirmed the utility of this bridge type; about 100 small bridges had been destroyed or seriously damaged, and many were quickly replaced with simple timber spans, such as those illustrated in the Timber Bridge section. Efforts were also increasingly directed to construction and improvements within towns and cities.

In the late 1930s and early 1940s, the bridge division of the State Highway Department experimented with new structural types. In 1936, construction began for two multiple-span, composite timber and concrete bridges; a third was constructed shortly thereafter (Bridges 9A, 445, and 707, respectively). These structures, highlighted in the Timber Bridge section, were touted in the State Highway

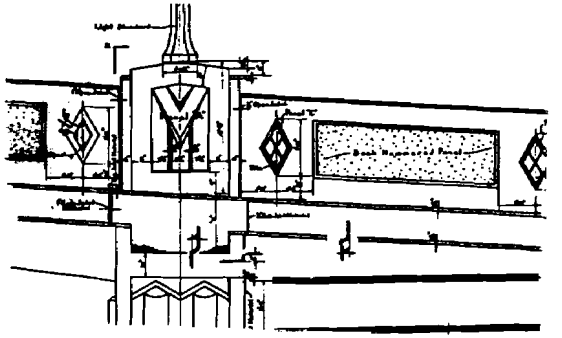
Department's Annual Report for 1936 as examples of "unusual construction", a "new and very economical design [whose] serviceability will be watched with interest by the Department's engineers." In 1940, the Department designed its first concrete through arch, or "rainbow" arch bridge, which was completed two years later (Bridge 246).

This experimental spirit and openness to innovation seems to characterize the bridge division under Bridge Engineer A. G. Livingston. Other structures designed during this period derive their stylistic inspiration from visions of the future: embellished with up-to-date "skyscraper style" design elements, these bridges reflect the machine aesthetic of the second quarter of the twentieth century. The drawing on this page illustrates this style.

At the same time, the design of masonry embellished structures continued with allusions to historic traditions; structures built under Department jurisdiction which featured masonry ornamentation include Bridges 543 (1934), 257 (1937), and 88 (1939). The Highway Department's Livingston appears to have favored these stone-faced bridges in wooded, often park-like settings of New Castle County. Livingston's notes and other documents may indicate his feeling that a structure's surroundings should influence its form, and that the stone masonry was an appropriate response to the landscape of northern New Castle County. Notes on the drawings for Bridge 543, a masonry-embellished steel girder bridge constructed in the area in 1934, provide insight into the inspiration for this treatment: "the site shows exposed rock thickly located around the entire vicinity; construction should conform as closely as possible to the surrounding country."

By 1940, the state road system comprised a total of 3,930 miles. About 44% of these roads were hard-surfaced, rated "dustless or better"; the remainder were still essentially unimproved, surfaced with traffic-bound slag, gravel, or dirt. New Castle County continued its established pattern of the state's most modern infrastructure, with 70% hard-surfaced roads in contrast to Kent and Sussex, where 63 to 65 per cent of the roads remained unimproved. The two lower counties together accounted for 90% of the unimproved road mileage in Delaware. Although Sussex had nearly twice the total road mileage of New Castle (1,863 miles v. 995 miles), it did not equal the northern county's total for hard-surfaced road, with only 648 miles to New Castle's 699.

Bridge construction in the early 1940s was seriously hampered by shortages of critical materials related to the war effort, especially steel. Important projects, such as federally-assisted grade crossing elimination structures, were awarded priority ratings by the Public Roads Administration to prevent problems in receipt of materials, but these ratings often proved difficult to obtain, and the application process itself introduced delays. Construction of Bridge 258, a concrete bridge highlighted in that section, was one example which was slowed by the war. Other projects were simply stalled. In its Annual Report for 1943, the State Highway Department observed that ". . . the bascule bridge over the Rehoboth Canal at Rehoboth begun in 1941, is still incomplete, and will probably remain so until critical materials are released". From 1943-1945, the Department did not award any major bridge contracts as "both manpower and materials were withheld for the war effort". However, the staff completed plans for 19 bridges for future construction after the war.



Art Moderne detail from original 1940 drawings for Bridge 257E.